RFLEX

KNEE CPM

SERVICE MANUAL

PATTERSON MEDICAL
SAMMONS PRESTON

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PRECAUTIONARY MEASURE

WARNING: TO REDUCE THE RISK OF ELECTRIC SHOCK:

Always unplug the R-Flex CPM before performing any maintenance procedures involving detaching CPM components.

A product should never be left unattended when plugged in.

Close supervision is necessary when this product is used by, on, or near children or invalids.

CAUTION: TO REDUCE THE INFLUENCE FROM THE MAGNETIC FIELD:

Always use non-magnetic screwdrivers to remove any fastening screws used on R-Flex CPM unit.

EXPLOSION HAZARD

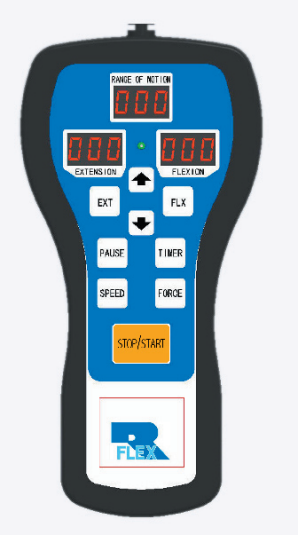
R-Flex CPM is not designed for use in the presence of flammable anesthetics.

Calibration Requirements:

1. R-Flex CPM unit must be calibrated when the angle value displayed on the hand controller differs from the actual value.
2. R-Flex CPM unit must be calibrated whenever maintenance is conducted on major components such as: potentiometer, power supply unit, circuit board, hand-controller, etc.
3. Consider unit calibration after extended periods of storage or lack of use.

Automatic Calibration Procedure:

1. Turn the power switch to 'OFF' position.
2. Adjust the Thigh Support to 18" on the Femur Scale.
   (See page 14 of user's manual)
3. Hold down ***EXT*** key and ***FLX*** key simultaneously and turn on the power. The code ***SEL*** and ***CAL*** will blink in the 'Extension' and 'Flexion' display windows on the hand controller.
4. Stop pressing the ***EXT*** and ***FLX*** keys. The unit is now automatically calibrated.
5. The R-Flex CPM unit should be observed traveling to full extension. The reading on the hand controller in the 'Range of Motion' display window should read ZERO when the calibration procedure is completed.
6. After the unit is calibrated, the hand controller can be set and operated as normal.

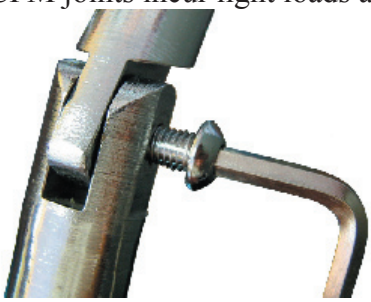


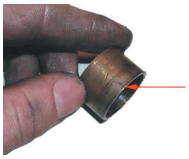
2000 Hour Maintenance Requirements

Once the R-Flex CPM unit has accumulated 2000 hours of operation, the yellow indicator light on the hand controller will blink to notify that preventive maintenance is due on the CPM unit.

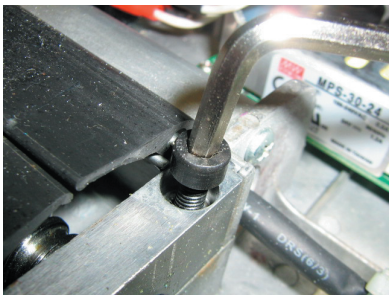
Maintenance on R-Flex CPM unit must be completed as follows:

1. Using a 4mm allen wrench, disassemble the 8 joints of the CPM bars and inspect the brass bushing inside each joint.
2. Replace any bushings that appear to be excessively worn.
3. Lubricate all joints lightly with lubricating oil. (Note: Do not use too much oil)
   CPM joints incur light loads and slow running speeds, so any class of oil can be used.

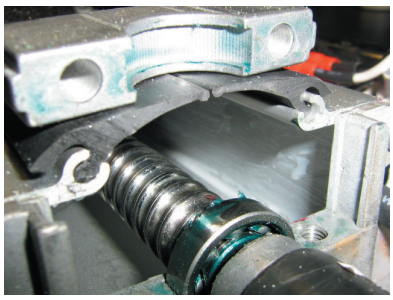
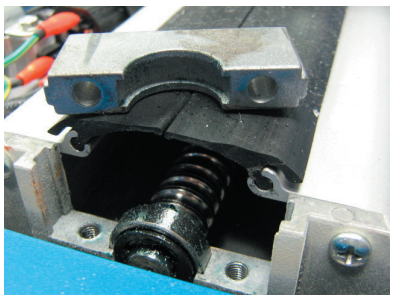
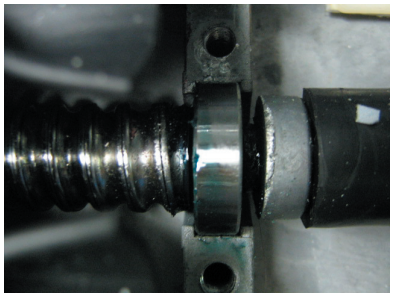
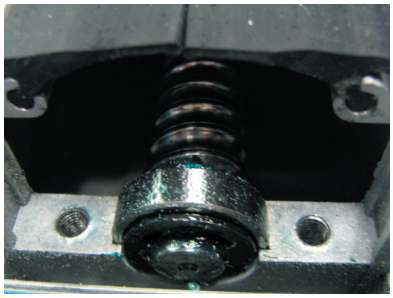




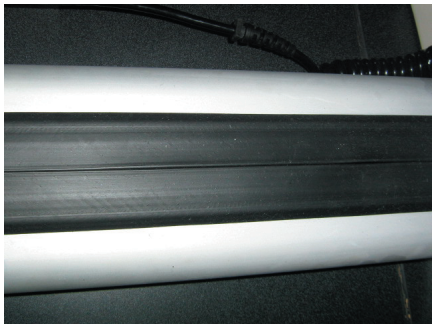
4. Using a 4mm allen wrench, remove the top cover of each ball bearing set located at the ends of the threaded screw. Apply grease to the ball bearings.



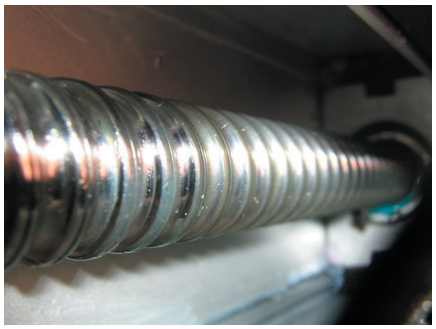
Note:
Perform a visual inspection on the ball bearings. If the surface of the bearing collar or balls are covered with marks caused by wearing, replace the ball bearing immediately.

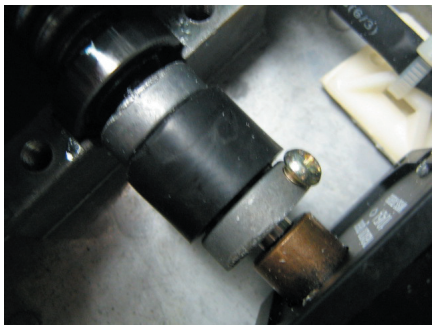
5. With the bearing cover still removed, inspect the rubber track seal on each side of the threaded screw guide. Replace if necessary.

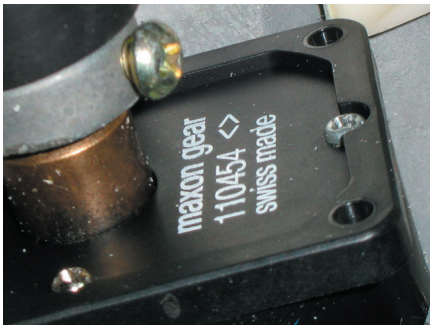


6. Inspect the threaded screw and apply new grease for lubrication.

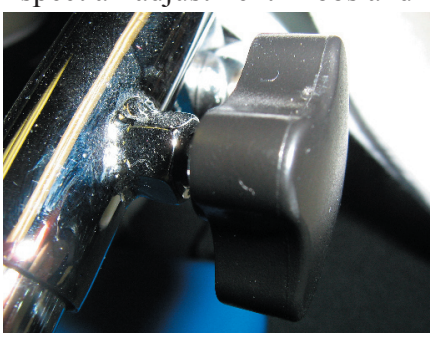


7. Perform a visual inspection of the coupling between the gearbox and the threaded screw. Ensure that the set screws in each coupling hub are still tight. Replace the coupling rubber piece if excessive wear is present.

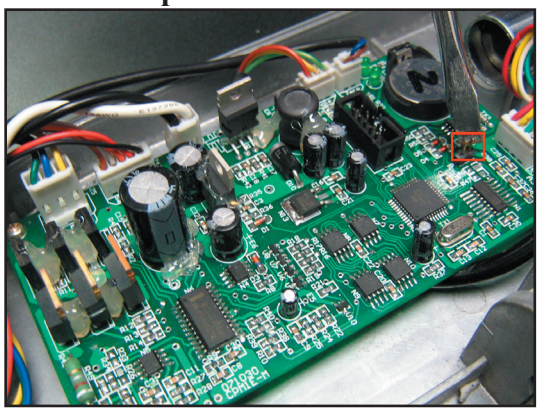




8 Inspect all adjustment knobs and replace if necessary.



Once maintenance is completed, shortcut the reset pin provided to shortcut the R-Flex CPM PCB to reset the cumulative operation hours to zero.



Troubleshooting:

1. The Hand-Controller does not work after turning on the power.

Possible Solutions

- Plug in the CPM unit if it's unplugged.
- If the CPM unit is plugged in, verify that the electrical outlet is live by checking breaker box or plugging in another device.
- Make sure that the Hand-Controller is properly attached with the CPM unit.
- Replace the fuse which is located just below the electrical connection on the unit. (F2A/250V/5x20mm)
- Contact CPM service provider if none of the above solutions work.

2. The CPM unit is working, but the angle value on the Hand-Controller is not indicating correctly.

Possible Solutions

- Perform the auto-calibration procedure on page 1.
- If auto-calibration doesn't solve the problem, unplug the CPM unit and remove the small casing that covers the potentiometer. Visually check that the potentiometer is properly installed and the assembly is not detached or loose.

- Contact CPM service provider if none of the above solutions work.

Error message displayed on Hand-Controller

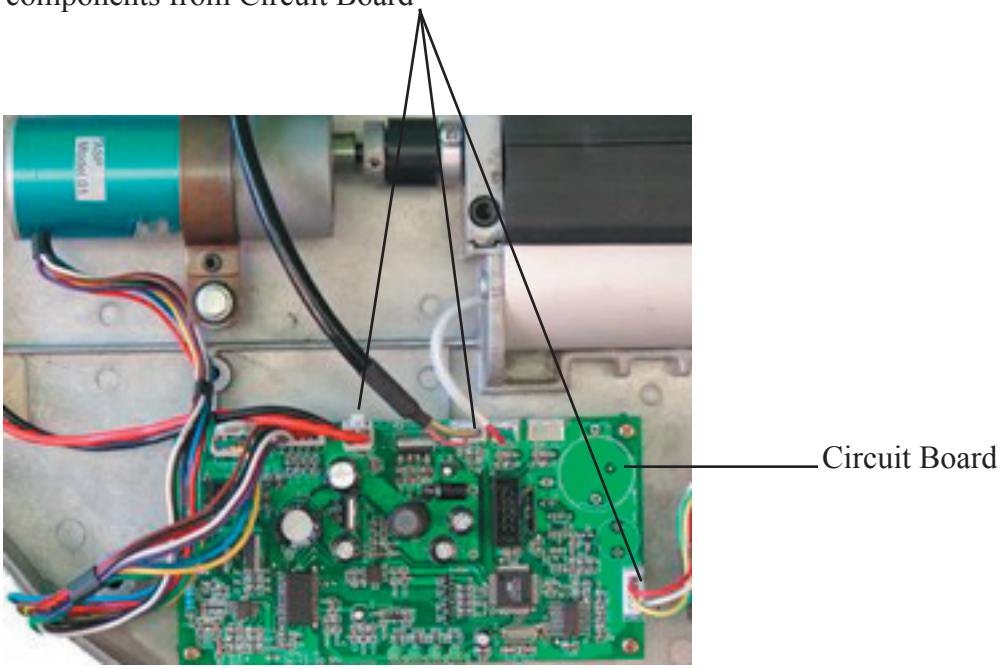
Error Code	Problem	Solution
E01	There is too much force on the machine in one direction. The machine will automatically begin traveling in the opposite direction	- Adjust the force setting to a higher setting - Make sure nothing is interfering with the CPM unit - Change the extension/flexion setting
E02	The machine stops because it is blocked or has excessive force in both directions of travel	- Adjust the force setting to a higher setting - Make sure nothing is interfering with the CPM unit - Change extension/flexion setting - Contact CPM service provider if problem remains
E03	The machine stops due to a motor drive problem	- Contact CPM service provider
E04	The machine stops due to angle control problem	- Contact CPM service provider
E05	The machine will stop during automatic calibration if the thigh support has not been adjusted to 18” on the femur measurement scale.	Adjust the thigh support to 18” on the femur measurement scale. Auto-calibration can then be continued.

Circuit Board Replacement Procedure

1. Turn off the power and unplug the CPM unit.

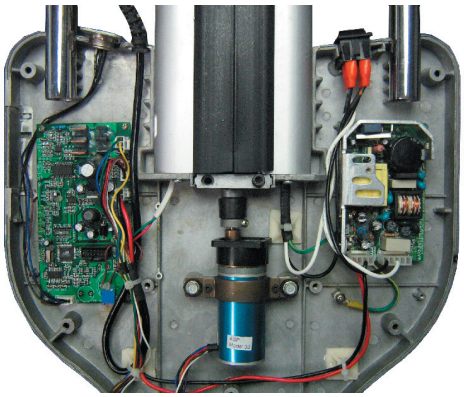
2. Using a Phillips head screwdriver, remove the cover from the control box.

3. Unplug all of the components from the circuit board, i.e. motor, power supply, potentiometer and hand controller connectors.



4. Using a NON-Magnetic screwdriver, loosen the 4 screws and remove old circuit board.

5. Install new board and secure in place with 4 screws.



6. Reinstall all connectors.

7. Perform auto-calibration procedure.

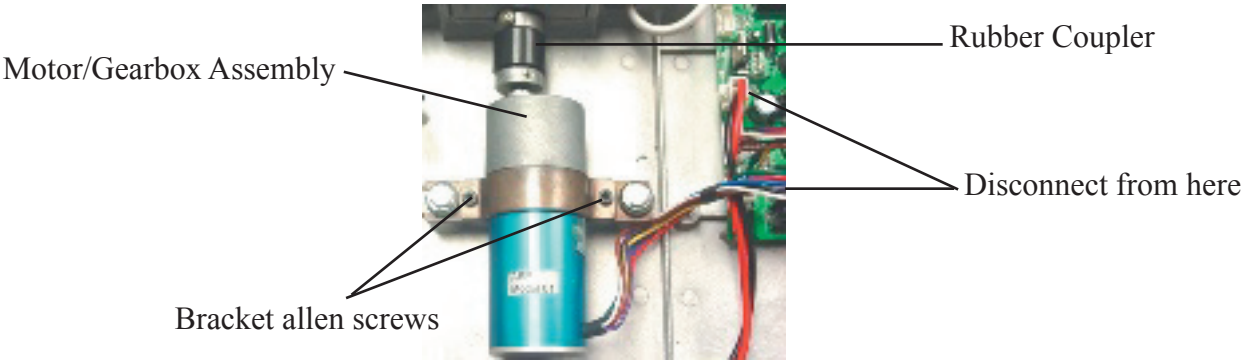
8. Reinstall the control box cover.

Motor and Gearbox Assembly Replacement Procedure

1. Turn off the power and unplug the CPM unit.

2. Remove the control box cover with a Phillips head screwdriver.

3. Using a 2.5mm allen wrench, loosen and remove the two motor bracket allen screws.
   (Note: Do NOT remove the two hex bolts.)



4. Detach the motor/gearbox assembly from the circuit board.

5. Gently pull the motor/gearbox assembly so that the coupling disengages from the rubber coupler.

6. Loosen the coupling set screw to remove the coupling from the gearbox shaft.

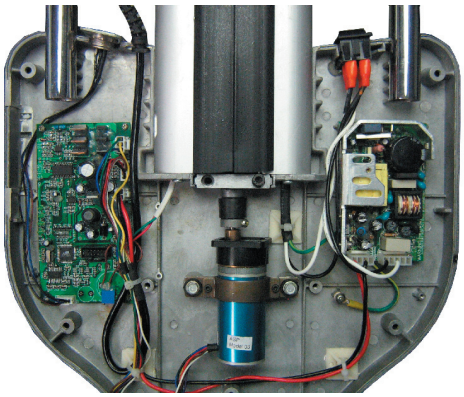
7. Install coupling onto new motor/gearbox assembly. Tighten set screw.

8. Engage the motor/gearbox assembly to the rubber coupler.

9. Reinstall 2.5mm allen screws and tighten motor into bracket.

10. Reconnect motor to circuit board.

11. Reinstall control box cover.

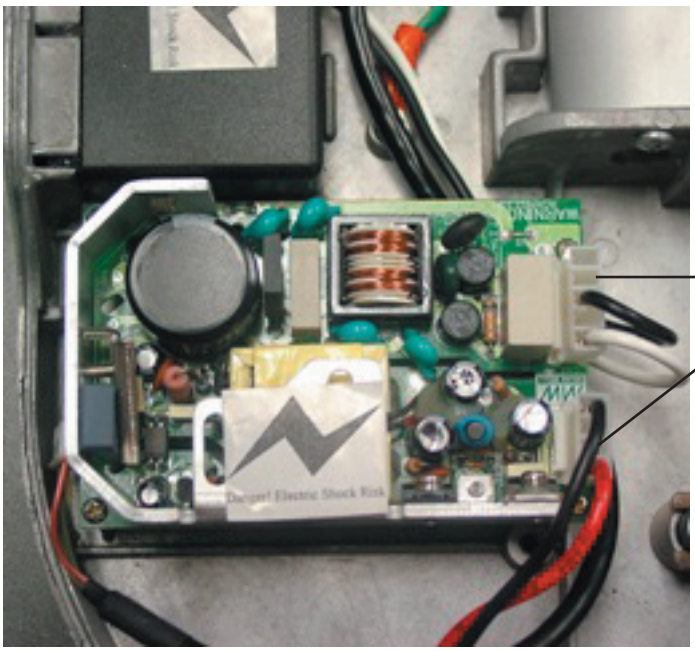


Power Supply Replacement Procedure

1. Turn off the power and unplug the CPM unit.

2. Remove the control box cover with a Phillips head screwdriver.

3. Disconnect the circuit board connector and plug connector from the power supply.



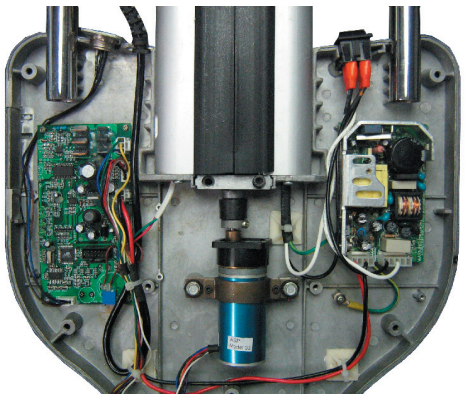
4. Using a NON-Magnetic screwdriver, loosen 4 screws and remove power supply from CPM unit.

5. Install new power supply and secure with 4 screws.

6. Reconnect circuit board connector and plug connector to power supply.

7. Reinstall control box cover.

8. Perform auto-calibration procedure on the CPM unit before use.



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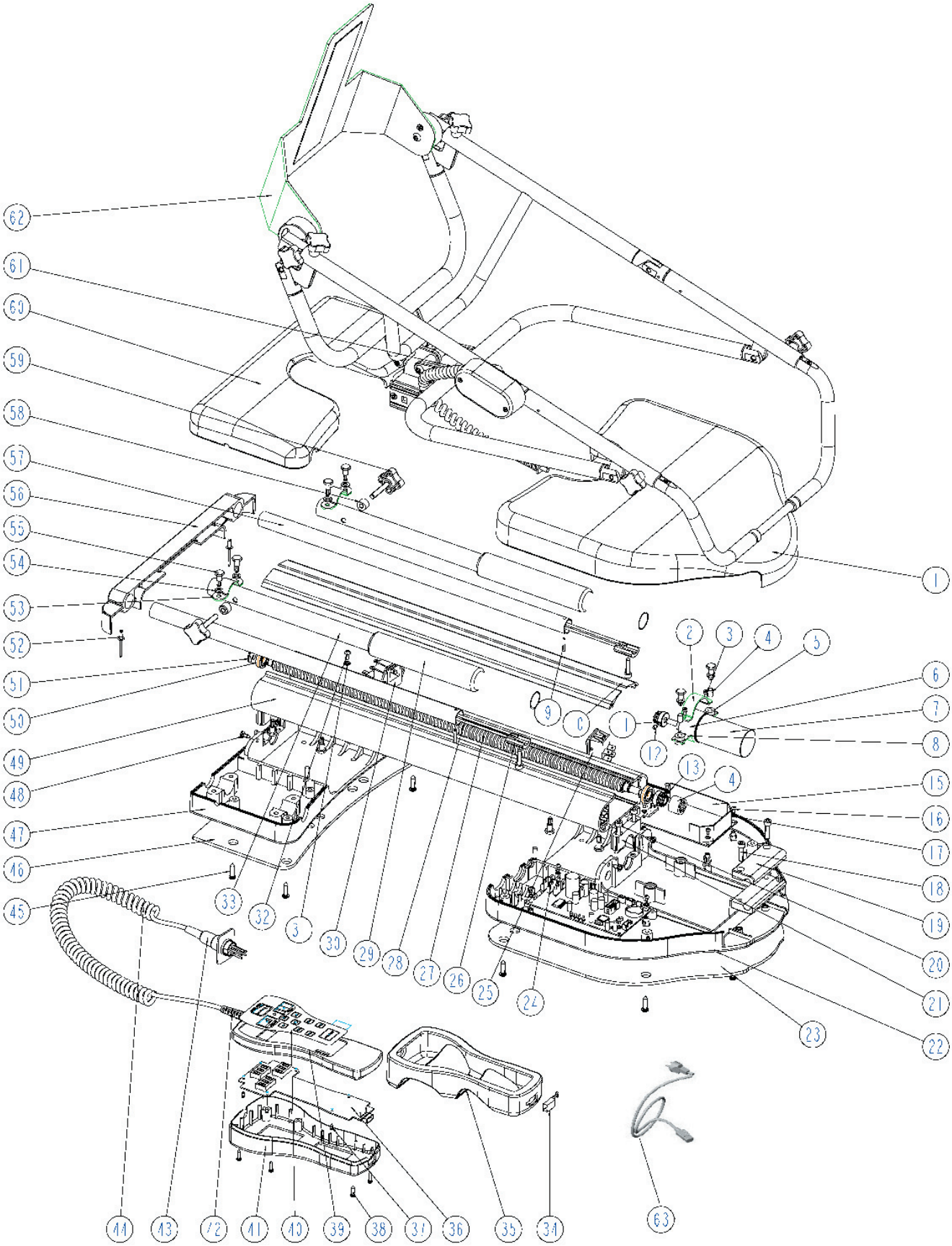
R-FLEX CPM EXPLODED VIEW

Sammons Preston−CPM Unit



COMPONENTS LIST

Item #	Component Name	Quantity
1	Front Plastic Cover	1
2	Motor Setting Plate	1
3	Hex Sunk Screw M3x5	2
4	Motor Lining	2
5	Motor Cushion	2
6	Gearbox	1
7	Motor	1
8	Motor Setting Ground Plate	1
9	Elastic Cylindrical Pin	2
10	Screw Shaft Seal Track	2
11	Coupling Arrangement B	1
12	Slotted Set Screws with Cup Point	2
13	Coupling Arrangement A	1
14	Elastic Connecting Piece	1
15	Power Supply Unit	1
16	Cross Recessed Pan Head Screw M3x5	8
17	Toothed Washer D3	8
18	Hex Sunk Screw M5x20	4
19	Carriage Connecting Piece	2
20	Hex Sunk Screw M5x25	4
21	Ball Bearing Block	2
22	Front Pedestal	1
23	Front Pedestal Non-Slip Mat	1
24	PCB	1
25	Power Switch	1
26	Stop Block	1
27	Screw Shaft	1
28	Stop Block String	2
29	Hand Lifting Foam	2
30	Fuse Ø 5x20	2
31	Toothed Washer D4	1
32	Cross Recessed Pan Head Screw M4x8	1
33	Transportation Handle	2
34	USB Cork	1
35	Hand Controller Protecting Sleeve	1

Item #	Component Name	Quantity
36	Hand Controller PCB	1
37	Cross Recessed Pan Head Tapping Screw ST22x6C	6
38	Cross Recessed Pan Head Tapping Screw ST29x13C	6
39	Hand Controller Front Casing	1
40	Hand Controller Display Panel	1
41	Hand Controller Back Casing	1
42	Hand Controller Cable Sheath	2
43	Quick Release Connector	1
44	Quint Spring Wire	1
45	Cross Recessed Pan Head Tapping Screw ST42x19C	9
46	Back Pedestal Non-Slip Mat	1
47	Back Pedestal	1
48	Cross Recessed Pan Head Thread Forming Screws M4x10	4
49	Aluminium Profile	1
50	Deep Groove Ball Bearings	2
51	Split Washer	1
52	Rivet	2
53	Transportation Handle Setting Plate	2
54	Flat Gasket	6
55	Hexagonal Bolt	14
56	Bedmount Device	1
57	Tie Bar	2
58	Thigh Adjustment Set Nut	2
59	Adjustment Knob	6
60	Back Plastic Cover	1
61	Potentiometer Spring Wire	1
62	Foot Cradle	1
63	Power Cord	1